Math 132 Exam 2 Review

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Use differentials to calculate the given number.

1) $\sqrt{4.25}$ 1) _____

Give your answer as a decimal. Round to 5 decimal places if necessary.

Find the integral.

2) $\int (5 + x^3)(4 - x^2)\,dx$ 2) _____

3) $\int \left(2\sqrt[3]{x^4} - x^{-3}\right) dx$ 3) _____

4) $\int (2 + 2x)e^{(4x + 2x^2)}\,dx$ 4) _____

Evaluate the integral.

5) $\int_1^e \left(16x - \frac{5}{x}\,dx\right)$ 5) _____

(Express your answer in terms for e.)

6) $\int_0^2 \frac{4x + 1}{4x^2 + 2x + 2}\,dx$ 6) _____

7) $\int_3^7 \frac{x^2 - 16}{x - 4}\,dx$ 7) _____

Provide an appropriate response.

8) Find f(x) if $f'(x) = \frac{3}{x^5}$ and $f\left(\frac{1}{2}\right) = 1$. 8) _____

9) Find the particular solution for the differential equation $\frac{dx}{dt} = \frac{1}{2 + x}$; $y(0) = 3$ 9) _____

10) Calculate the Riemann sum, S_n, for the function $f(x) = x^2 - 3x - 10$ on the interval $[-3, 7]$. 10) _____
Partition $[-3, 7]$ into five subintervals of equal length and for each subinterval $[x_{k-1}, x_k]$, let C_k be the midpoint.

11) Given $\int_3^5 f(x)\,dx = 7$ and $\int_3^5 g(x)\,dx = 1$, find $\int_3^5 [4f(x) - 2g(x)]\,dx$. 11) _____

12) Given that $\int_5^7 f(x)\,dx = 6$, $\int_2^5 g(x)\,dx = 2$, $\int_2^7 g(x)\,dx = \frac{5}{3}$, find the definite integral $\int_7^5 (4g(x) - 2f(x))\,dx$. 12) _____

13) Find the area bounded by $f(x) = x^2 - 4x - 5$ and $y = x + 1$. 13) _____

14) Find the area bounded by the parabolas $y = 6x - x^2$ and $y = x^2 - 2x$. 14) _____

Applications.

15) A company finds that consumer demand quantity changes with respect to price at a rate given by $D'(p) = -\frac{2000}{p^2}$. Find the demand function if the company knows that 832 units of the product are demanded when the price is \$5 per unit. 15) _____

16) At the beginning of an advertising campaign for a new product in a city of 500,000 people, no one is aware of the product. After 10 days, 100,000 people are aware of the product. If $N = N(t)$ is the number of people (in thousands) who are aware of the product t days after the beginning of the advertising campaign, solve the following differential equation for $N(t)$:
$\frac{dN}{dt} = k(500 - N)$; $N(0) = 0$; $N(10) = 100$. 16) _____

17) The number of cheeseburgers (in thousands) sold each day by a chain of restaurants t days after the end of an advertising campaign is given by $S(t) = 9 - 10e^{-0.3t}$. What is the average number of cheeseburgers sold each day during the first 7 days after the end of the advertising campaign? 17) _____

1) 2.06250

2) $20x - \frac{5}{3}x^3 + x^4 - \frac{1}{6}x^6 + C$

3) $\frac{6}{7}x^{7/3} - \frac{1}{2x^2} + C$

4) $\frac{1}{2}e^{(4x + 2x^2)} + C$

5) $8e^2 - 13$

6) 1.199

7) 36

8) $-\frac{3}{4}x^{-4} + 13$

9) $y = \ln|2 + x| - \ln 2 + 3$

10) -40

11) 26

12) $\frac{40}{3}$

13) $\frac{343}{6}$

14) 21.333

15) $D(p) = \frac{2000}{p} + 432$

16) $N(t) = 500(1 - e^{-0.022t})$

17) 4821 cheeseburgers